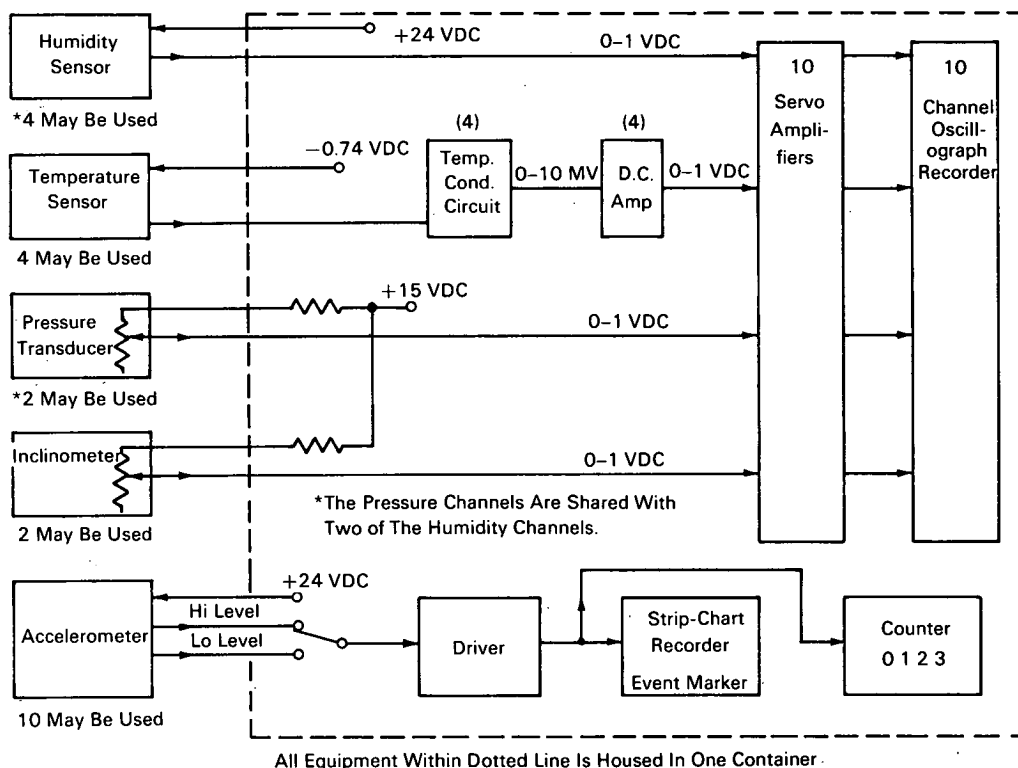


NASA TECH BRIEF



NASA Tech Briefs are issued to summarize specific innovations derived from the U.S. space program, to encourage their commercial application. Copies are available to the public at 15 cents each from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

Instrumentation Monitors Transported Material Through Variety of Parameters



The problem:

In transporting sensitive or delicate equipment, it is desirable to have a record of the environmental parameters such as temperature, pressure, humidity, shock, and acceleration to which the equipment is exposed. Prior methods have used instrumentation and materials (such as desiccant that changes color with humidity change) that are not related to time but rather to maximum and minimum limits.

The solution:

A transport instrumentation system that measures all parameters of interest and records them constantly

in time reference. The system provides a complete historical record plus the capability of taking corrective action where indicated by real time readout.

How it's done:

Two recorders provide output indications from a system of sensing elements such as accelerometers, temperature sensors, humidity sensors, pressure transducers, and inclinometers. A single housing contains the two recorders: one, a 10-channel analog device of the pen-oscillograph type uses servo balanced bridges to record temperature, humidity, pressure, and inclination; the other, a 10-channel digital records

(continued overleaf)

accelerations or impacts that exceed specified limits. The sensors are relatively standard, commercially available items that, combined with the recorders, provide a system with overall accuracies in the order of $\pm 3\%$ depending on the frequency and exactness of calibration procedures.

Notes:

1. The value of the system lies in its broad coverage of environmental parameters recorded in real time with a time reference for use in analysis of changing conditions.

2. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B67-10545

Patent status:

No patent action is contemplated by NASA.

Source: H. S. Hanson
of North American Aviation, Inc.
under contract to
Marshall Space Flight Center
(MFS-12938)